



A WORLD OF CONNECTIVITY

FOR IoT SOLUTIONS

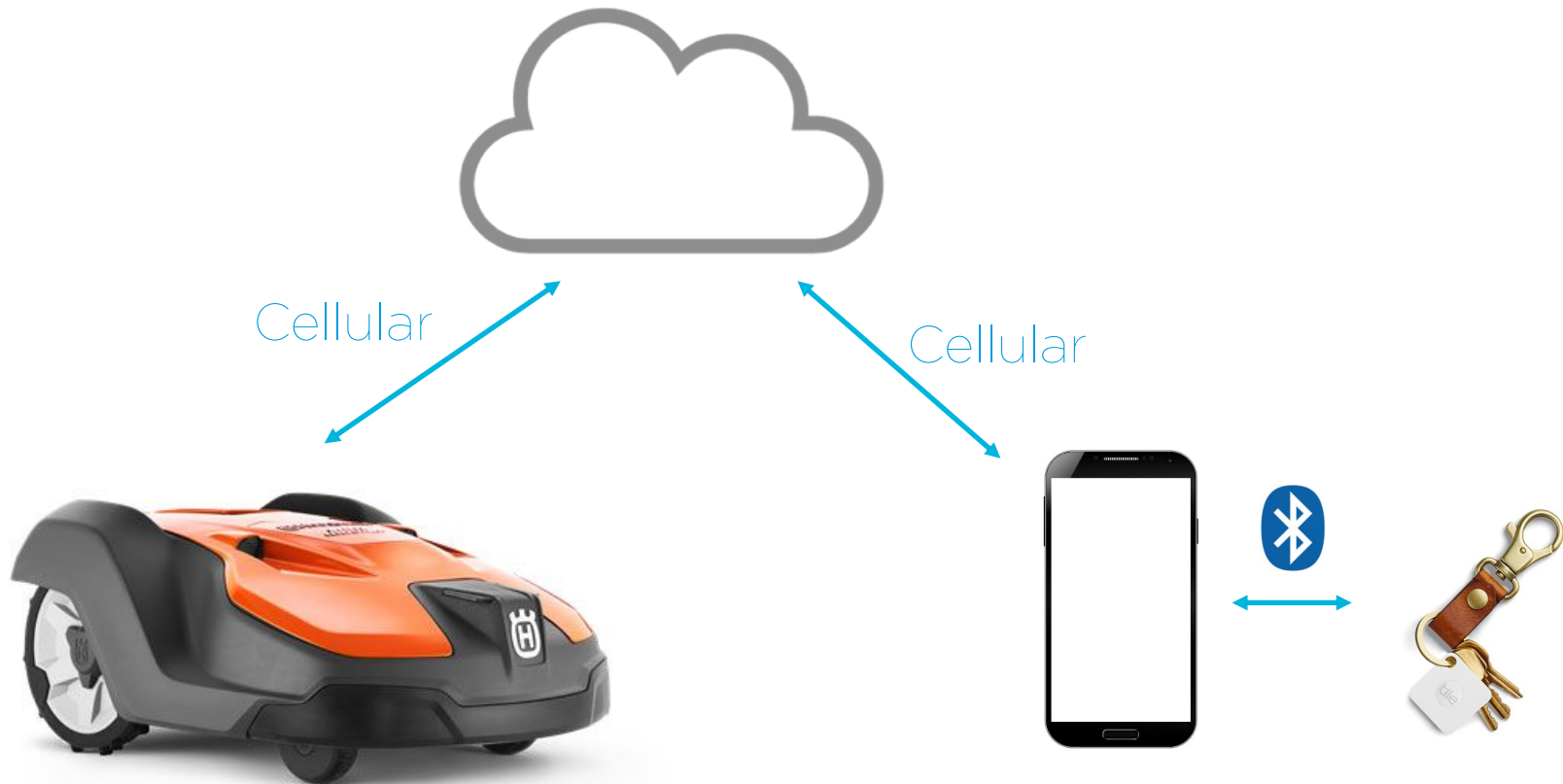
Thomas Soederholm

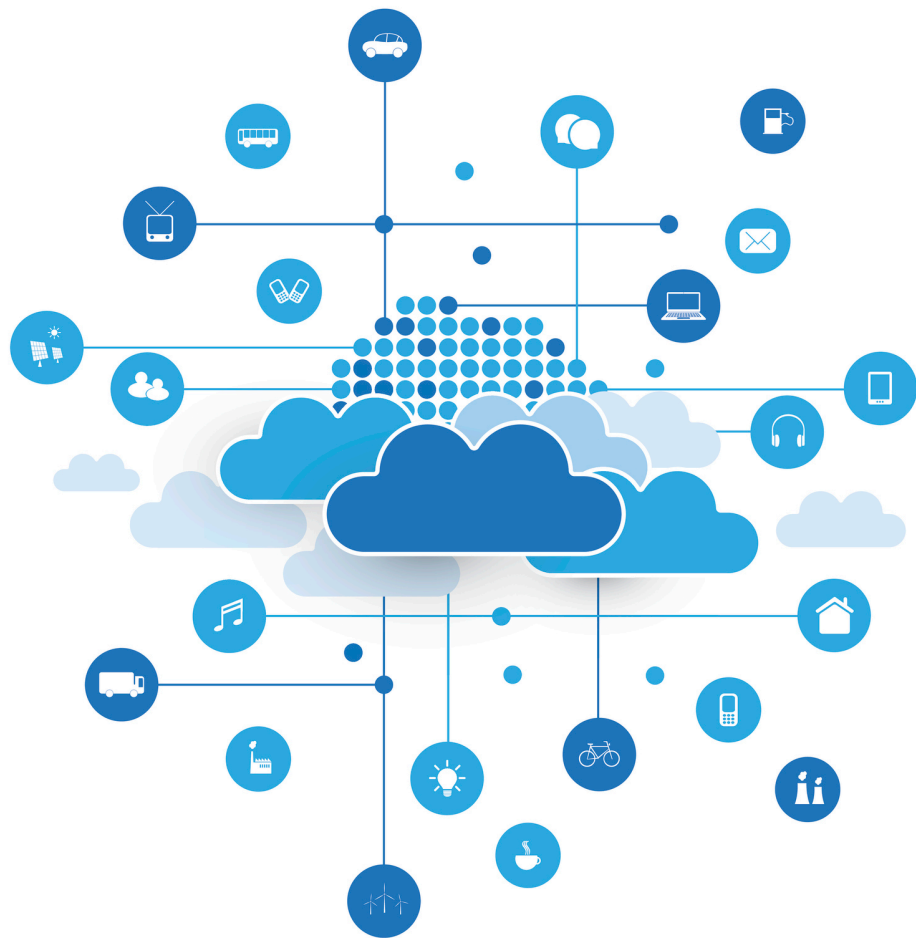
Director of Business Development

ANT Symposium 2019











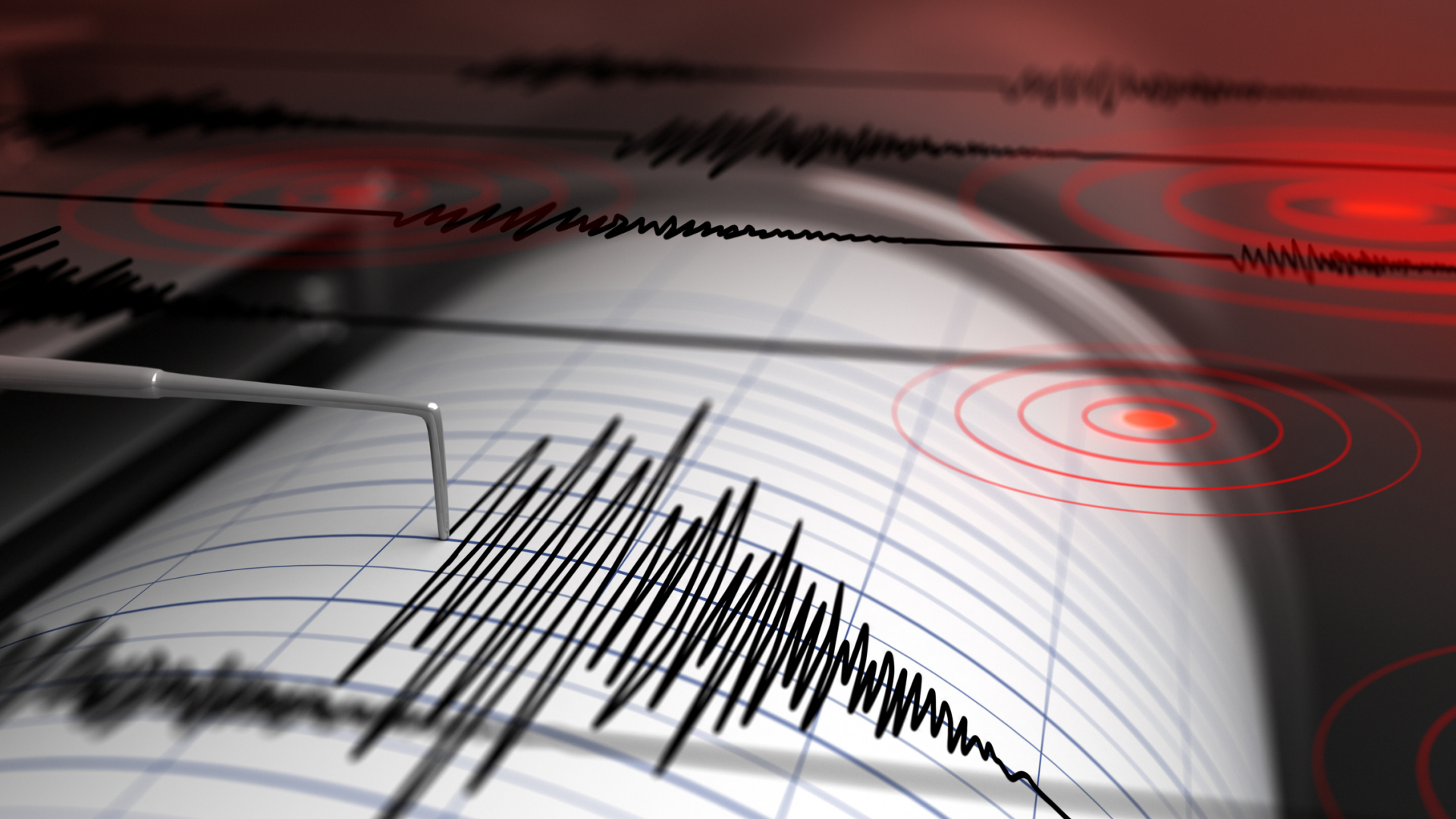
Remote maintenance

Remote access control

BIG DATA

Cloud analytics











2G 

LoRa 

WiFi 

 sigfox

3G 

THREAD

 ZigBee

 NB-IoT

 Bluetooth

 ANT+

LTE- M



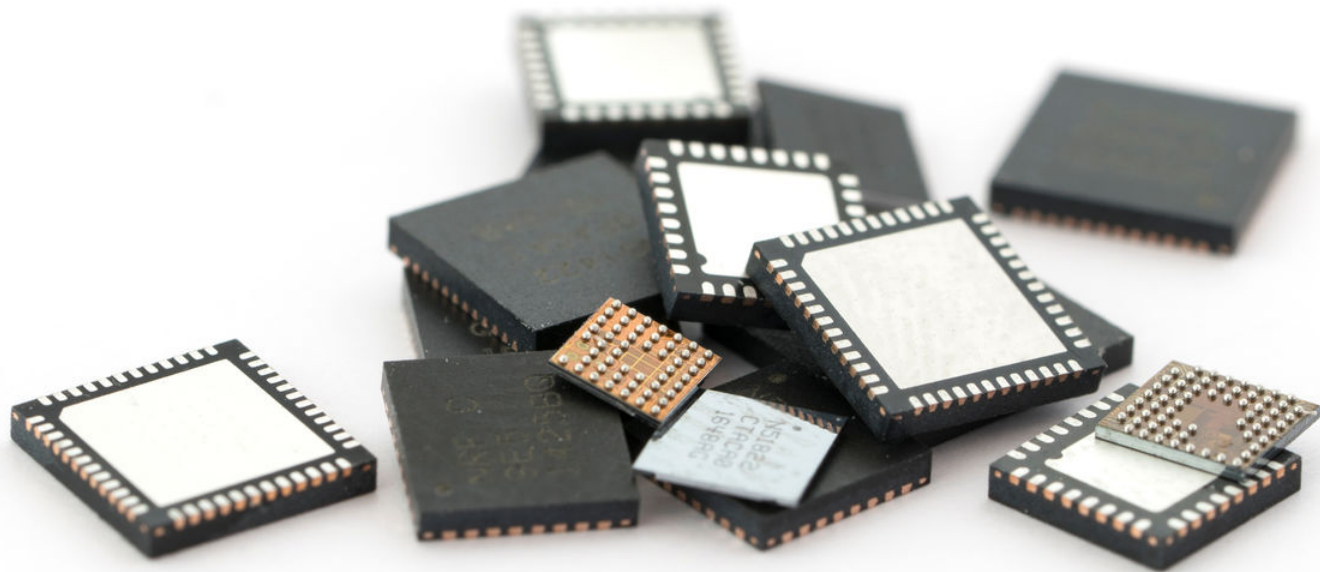








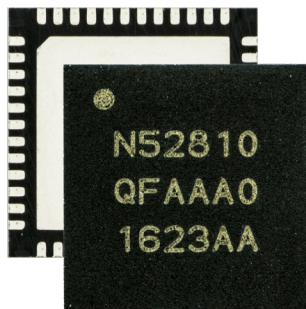




nRF
52
SERIES

Low end

nRF52810



ARM Cortex M4

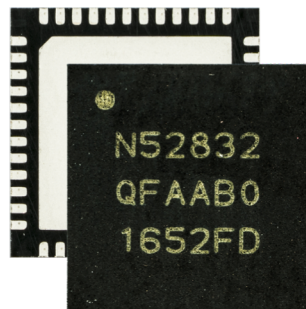
192 kB Flash

24 kB RAM

ANT - Bluetooth 5

Mid end

nRF52832



ARM Cortex M4F

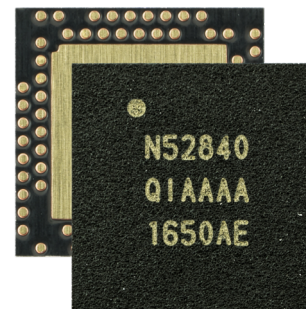
512 kB Flash

64 kB RAM

ANT - Bluetooth 5

High end

nRF52840



ARM Cortex M4F + Cryptocell

1024 kB Flash

256 kB RAM

ANT - Bluetooth 5

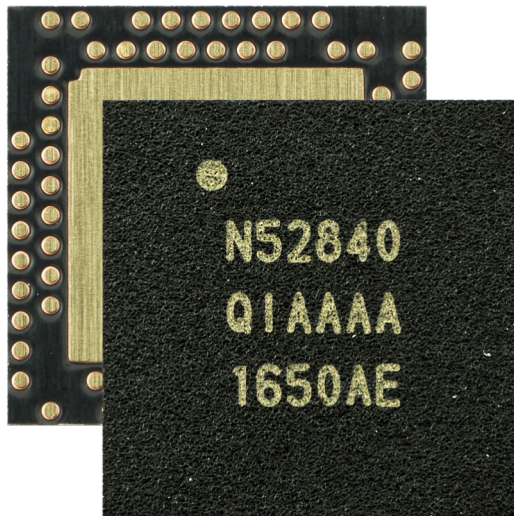
802.15.4 - Thread - Zigbee



nRF52840

PROPRIETARY

2.4GHz



θ H R E A D



802.15.4

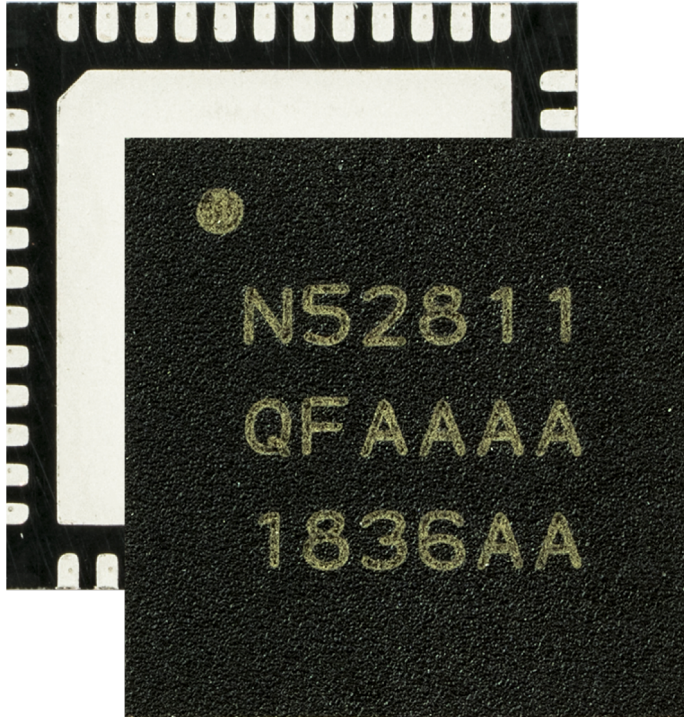


LONG RANGE

802.15.4



nRF52811 – Entry level SoC

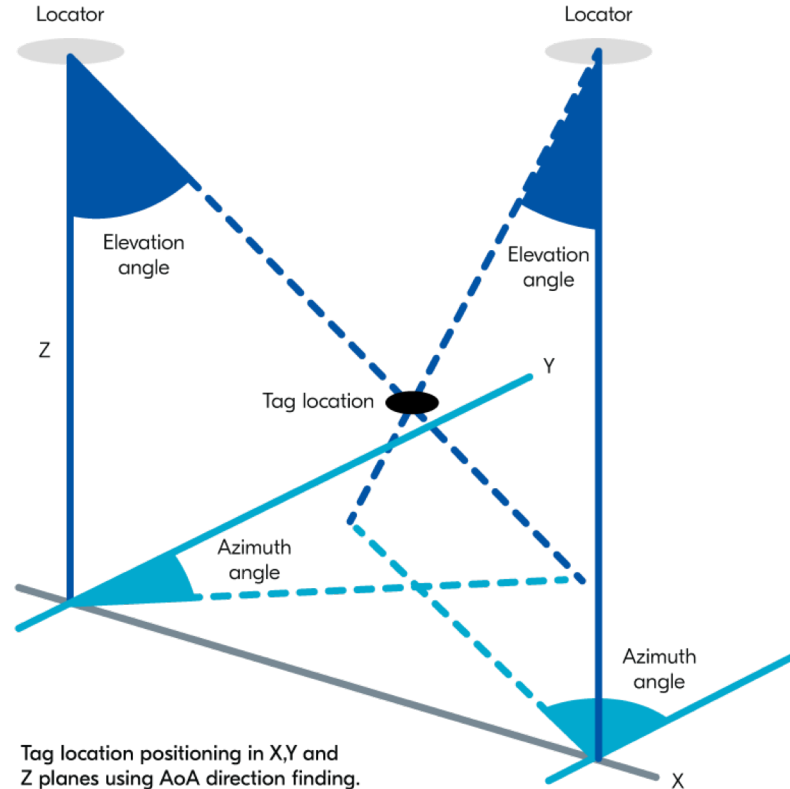


- ARM Cortex M4
- 192 kB Flash
- 24 kB RAM
- Bluetooth 5 Long range
- 802.15.4 – Thread



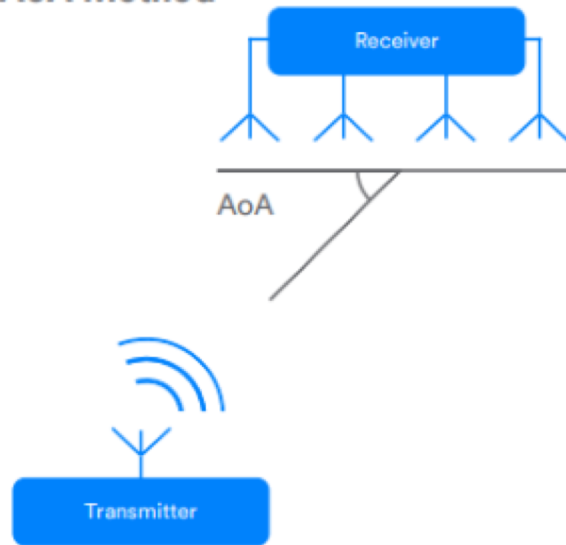


Direction finding



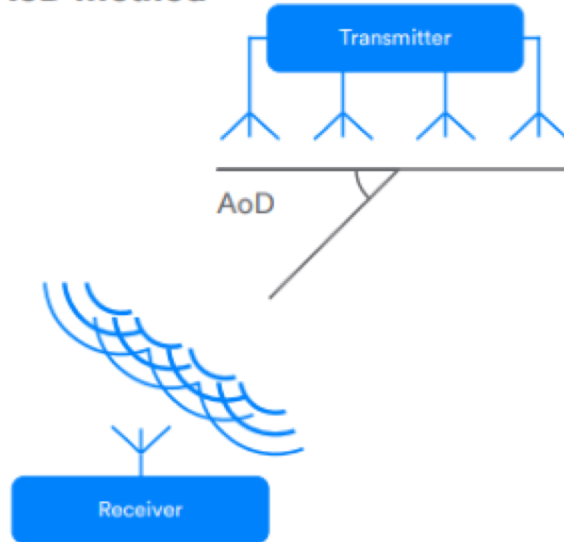
Angle of Arrival (AoA)

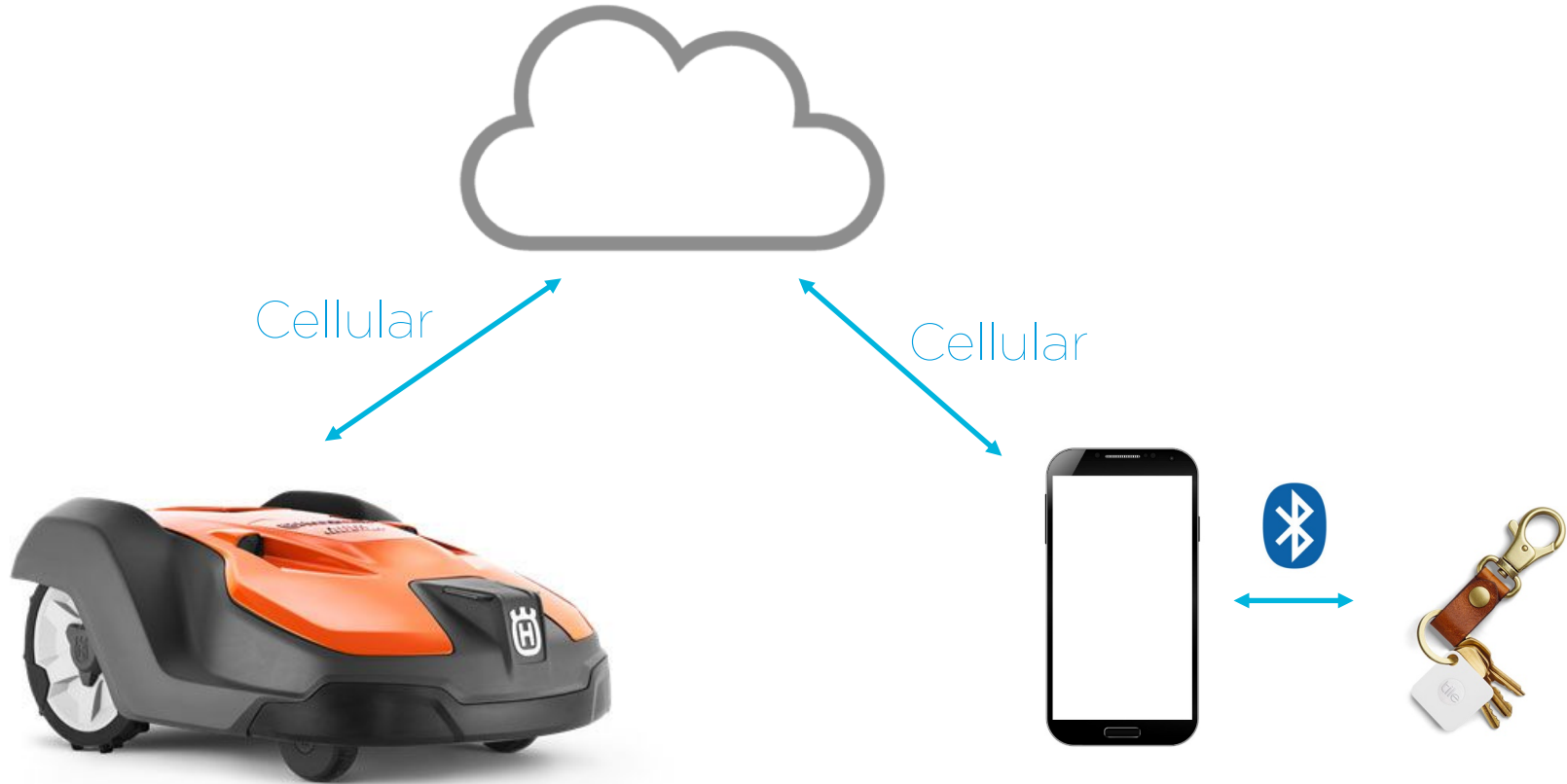
AoA Method



Angle of Departure (AoD)

AoD Method







LTE-M

The logo for LTE-M features the text "LTE-M" in a bold, black, sans-serif font. The letter "M" is white and is centered within a red sphere. The sphere is composed of a grid of small red dots, with the "M" shape cut out of the center.

 **NB-IoT™**

The logo for NB-IoT features a green circular icon on the left. The icon contains a white circuit board pattern and is topped with three curved lines representing signal waves. To the right of the icon, the text "NB-IoT™" is written in a bold, green, sans-serif font.

Low Power LTE Technologies



Low-medium throughput - up to 375 kB/s for LTE-M



Long range - up to 7x traditional LTE for NB-IoT

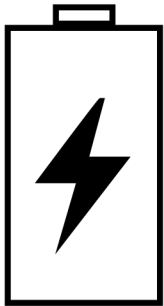


Long battery life - up to 15 years





Low Power



Built from
scratch for low
power operation

Integration



Advanced packaging
techniques to reduce
solution size

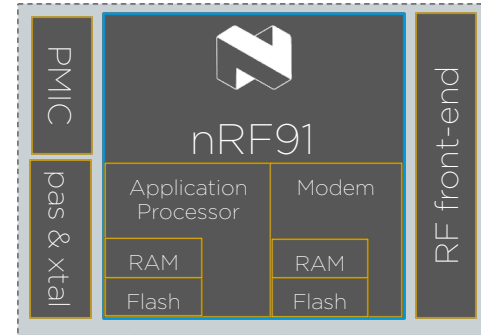
Ease of Use



Enable self-service for
thousands of customers and
hundreds of applications

nRF9160

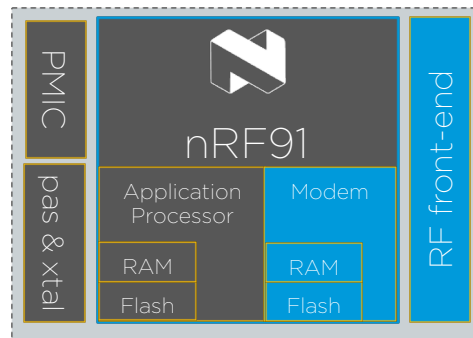
- Fully integrated SoC for IoT
- Modem with integrated RFFE and power management
- CPU core and memory exclusively for application
- Pre-certified for world wide operation



nRF9160 10x16x1 mm SiP

Low Power Modem

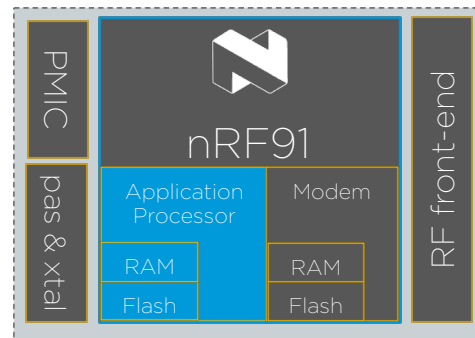
- Low power operation
- LTE-M and NB-IoT modem FW
- Best-in-class coverage
- World-wide operation
- GPS
- IPv4/IPv6, TCP/UDP, TLS/DTLS
- 50 Ω antenna pin interface
- Supports any SIM or eSIM



nRF9160 10x16x1 mm SiP

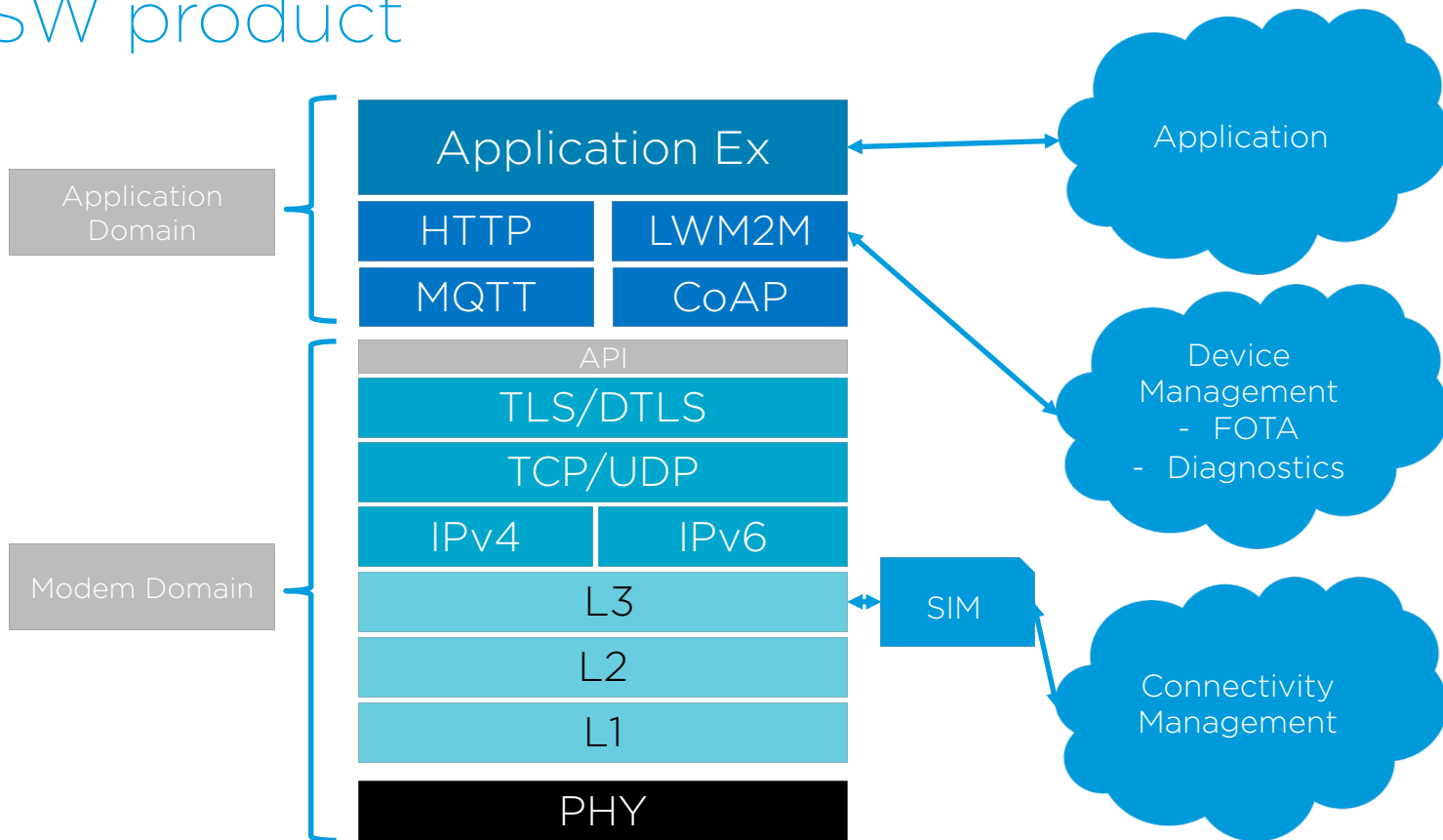
Application Processor

- 64 MHz ARM® Cortex® -M33 CPU
- ARM® Trustzone® to prevent over-the-air attacks
- ARM® Cryptocell 310 for application-level security
- 1 MB flash, 256 kB RAM
- 4x(SPI/UART/I2C), PDM, I2S, PWM, ADC
- 10x16x1 mm SiP with 32 GPIO



nRF9160 10x16x1 mm SiP

The SW product



Power Consumption Example

- LTE-M connection
- 23 dBm output power
- 10 minutes downlink latency (eDRX)
- ~ 11 μ A

15+ years battery life



3.7 V, 2700 mAh

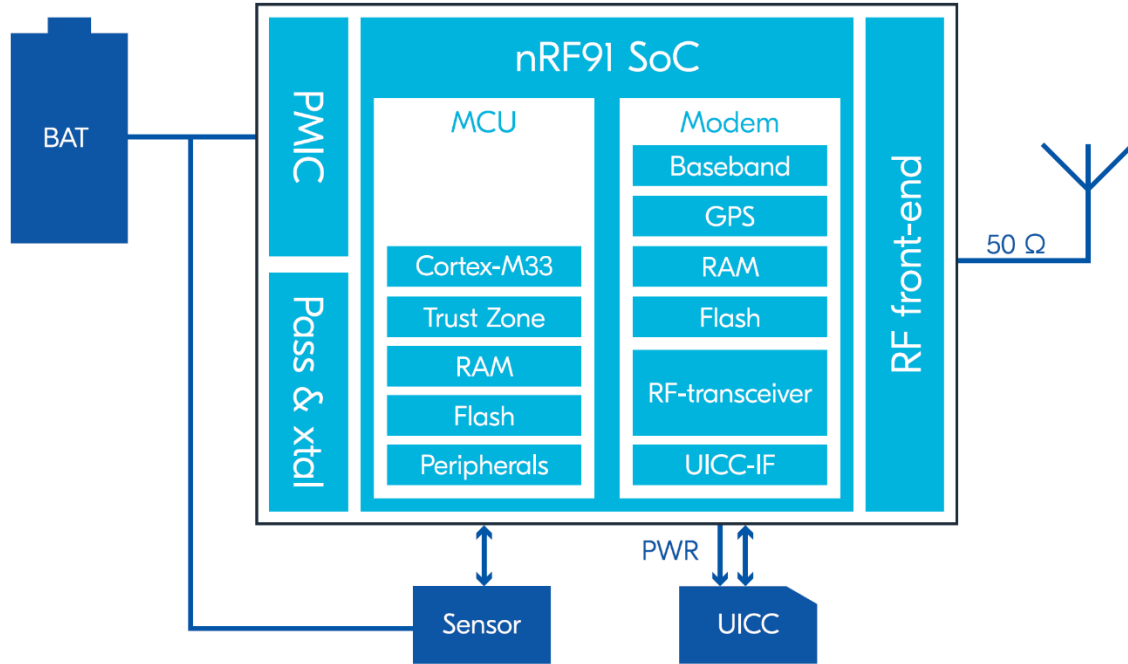
Power Consumption Example

- LTE-M connection
- 23 dBm output power
- Sending tracking info every 20s (DRX)
- ~ 0.5 mA

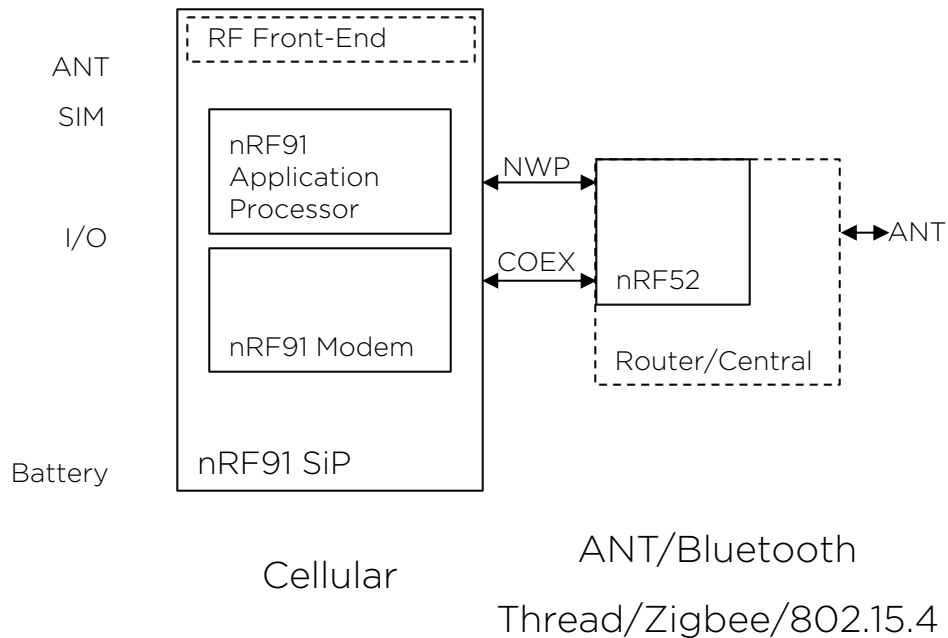
6+ months battery life



3.7 V, 2700 mAh



Mix and match with short range

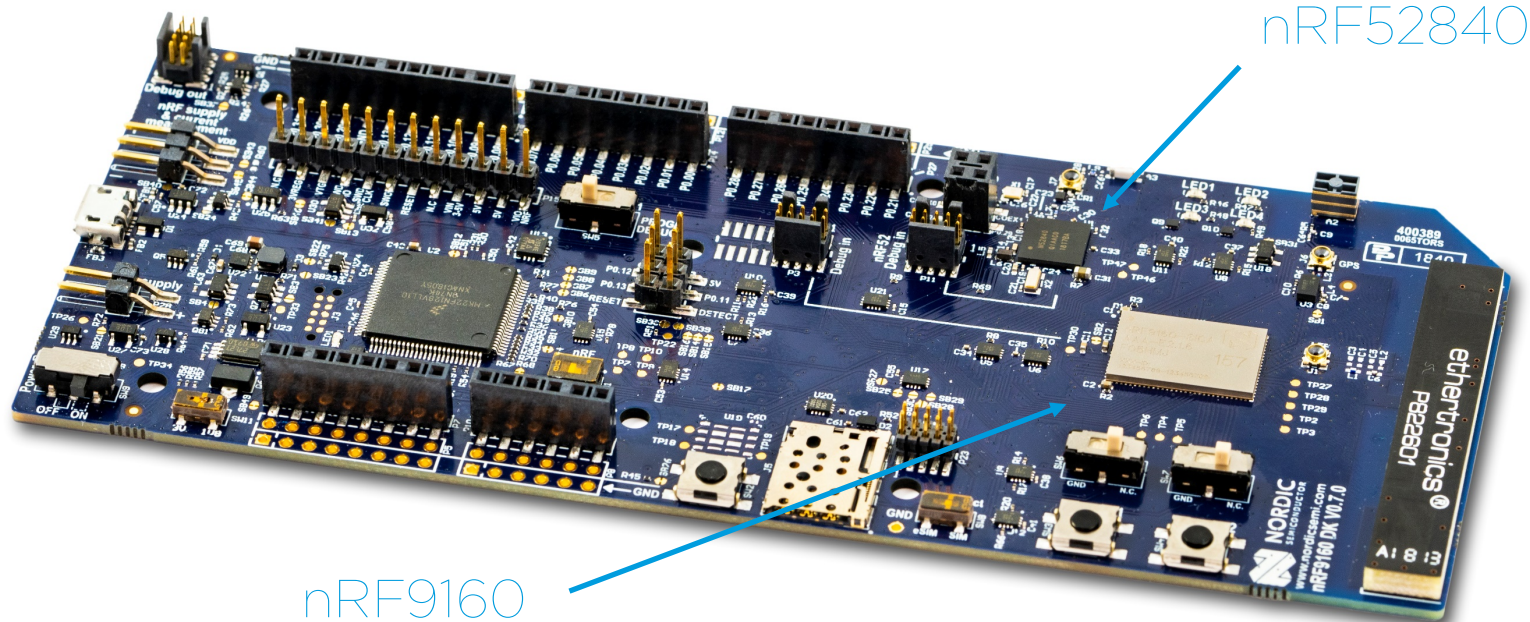


Chipset approach

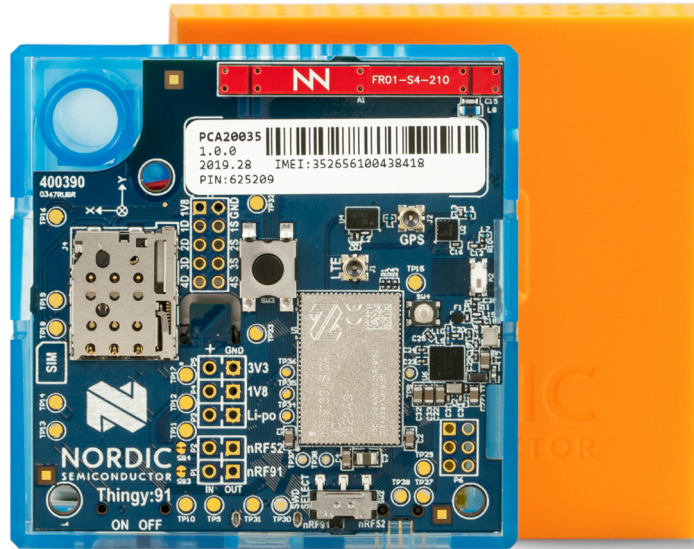
Automatic coexistence interface

Software drivers and sample application in the SDK

nRF9160 DK

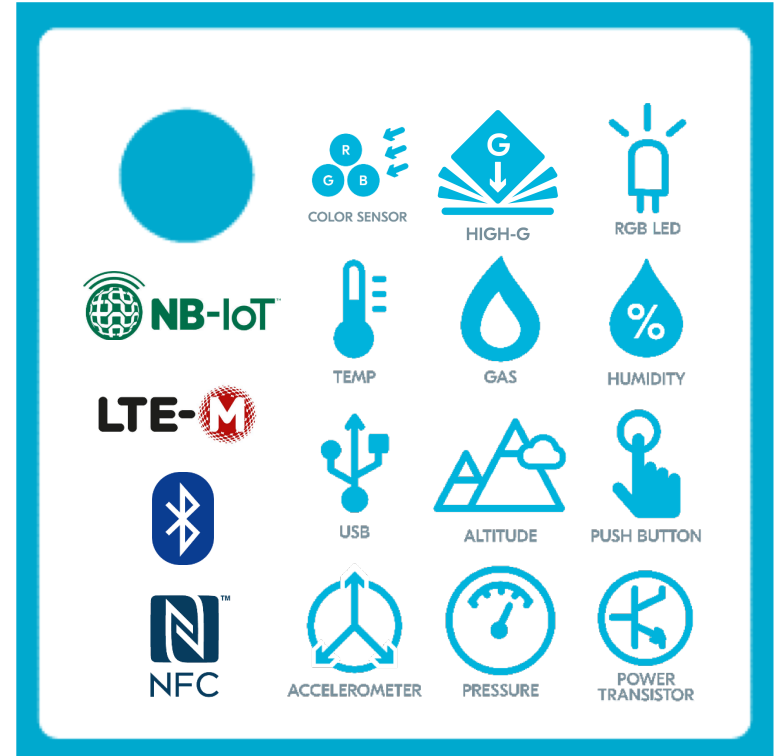


Thingy:91



Thingy:91

- cloT: LTE-M and NB-IoT
- Short range: Bluetooth Low Energy
- Positioning: GPS
- Touch-to-pair: NFC
- Sensors: various
- Power: LiPo battery
- SIM: iBasis global roaming



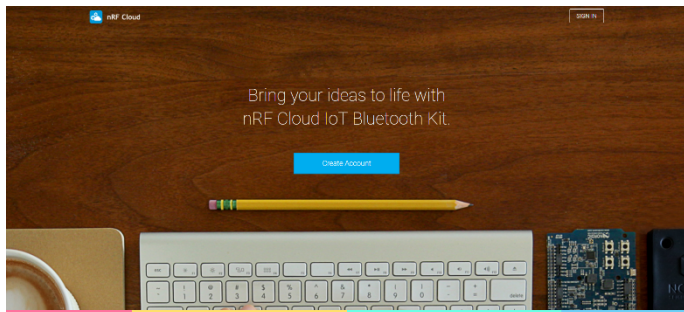
Asset tracker example

- Pre-loaded in Thingy:91
- GPS position + LTE-M
- Thingy:91 sensor data
- Relayed to nRF Connect for Cloud



Delivery Services

nRF Connect for Cloud



Easily connect & configure your Bluetooth IoT prototype in the cloud.



Connect

Use your PC, iPhone or Android phone to connect your Bluetooth-enabled Nordic DevKit device to the cloud.



Configure

Control device settings and notifications from the cloud—no coding required. Plus, automatically install firmware updates.



Monitor

Track live data, review historic data and receive alerts in real time on the cloud with intuitive interface.



Share

Collaborate on projects by adding team members to your account. Present proof of concept ideas. Share results with anyone.

- IoT platform extension
- Connect - Develop - Deploy
- Cellular IoT
- Bluetooth Low Energy
- Built on AWS







Thank you 😊